

WARM-UP

① Solve the system:

$$\begin{cases} 3x + 2y - z = 4 \\ x + y + 3z = 1 \\ -2x + y - 5z = -5 \end{cases}$$

② Multiply:

a) $\begin{bmatrix} 2 & 4 \\ 1 & 3 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

b) $\begin{bmatrix} 3 & 2 & -1 \\ 1 & 1 & 3 \\ -2 & 1 & -5 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix}$

$$\begin{cases} 1) & 3x + 2y - z = 4 \\ 2) & x + y + 3z = 1 \\ 3) & -2x + y - 5z = -5 \end{cases}$$

① Create a system with 2 equations.

$$2) \quad x + y + 3z = 1$$

$$3) \quad -2x + y - 5z = -5$$

$$4) \quad 3x + 8z = 6$$

$$1) \quad 3x + 2y - z = 4$$

$$2) \quad 2x + 2y + 6z = 2$$

$$5) \quad x - 7z = 2$$

② Solve the 2-system system.

$$4) \quad 3x + 8z = 6$$

$$5) \quad 3x - 21z = 6$$

$$-29z = 0$$

$$z = 0$$

$$3x + 8(0) = 6$$

③ Plug in x, z into ^{one} original equation

$$-2(2) + y - 5(0) = -5$$

$$-4 + y = -5$$

$$+4$$

$$+4$$

$$y = -1$$

$$(2, -1, 0)$$

④ CHECK!

a)

$$\begin{bmatrix} 2 & 4 \\ 1 & 3 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 2 \cdot 1 + 4 \cdot 0 & 2 \cdot 0 + 4 \cdot 1 \\ 1 \cdot 1 + 3 \cdot 0 & 1 \cdot 0 + 3 \cdot 1 \end{bmatrix}$$

$(2 \times 2) (2 \times 2)$
 2×2

$$= \begin{bmatrix} 2 & 4 \\ 1 & 3 \end{bmatrix}$$

b)

$$\begin{bmatrix} 3 & 2 & -1 \\ 1 & 1 & 3 \\ -2 & 1 & -5 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix}$$

$(3 \times 3) (3 \times 1)$
 3×1

$$4 \cdot 1 = 4$$

$$\begin{bmatrix} 3x + 2y - z \\ x + y + 3z \\ -2x + y - 5z \end{bmatrix}$$

$$4.2: (15) (17)$$

$$4.3: (9) (23) (24)$$

$$4.2: \begin{bmatrix} x \\ y \\ z \end{bmatrix} \stackrel{?}{=} \begin{bmatrix} x & y & z \end{bmatrix}$$

$$(17) \begin{bmatrix} 2 & 4 \\ 8 & 12 \end{bmatrix} = \begin{bmatrix} 4x-6 & -10t+5x \\ 4x & 15t+1.5x \end{bmatrix}$$

X not same

$$4 = -10t + 5x$$

$$12 = 15t + 1.5x$$

$$4x = 8$$

$$x = 2$$

$$4 = -10t + 5(2)$$

$$4 = -10t + 10$$

$$-10$$

$$-10$$

$$\frac{-6}{-10} = \frac{-10t}{-10}$$

$$t = \frac{6}{10} = \frac{3}{5}$$

$$\textcircled{9} \quad 3 \begin{bmatrix} 2 & 0 \\ -1 & 5 \end{bmatrix} - 2x = \begin{bmatrix} -10 & 5 \\ 0 & 17 \end{bmatrix}$$

$$\begin{bmatrix} 6 & 0 \\ -3 & 15 \end{bmatrix} - 2x = \begin{bmatrix} -10 & 5 \\ 0 & 17 \end{bmatrix}$$

$$-2x = \begin{bmatrix} -10-6 & 5-0 \\ 0-(-3) & 17-15 \end{bmatrix}$$

$$-\frac{1}{2}(-2x) = \frac{1}{2} \begin{bmatrix} -16 & 5 \\ 3 & 2 \end{bmatrix}$$

$$x = \begin{bmatrix} 8 & -\frac{5}{2} \\ -\frac{3}{2} & -1 \end{bmatrix}$$

$$x = \sim$$

② HF

(2 × ~~2~~ (2 × 1))

\overline{H}

$$H = \begin{bmatrix} -5 \\ 6 \end{bmatrix} \quad \overline{F} = \begin{bmatrix} 2 & 3 \\ 6 & 9 \end{bmatrix}$$

(2 × 1) (2 × 2)

HF = undefined

$$a) \begin{bmatrix} 2 & 4 \\ 1 & 3 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 2 & 4 \\ 1 & 3 \end{bmatrix}$$

↑ identity matrix

$$\begin{aligned} A \cdot I &= A \cdot A^{-1} \\ \cancel{A \cdot A^{-1}} \cdot I &= \cancel{A \cdot A^{-1}} \Rightarrow A \cdot A^{-1} = I \\ \frac{1}{3} \cdot 3x &= 151 \cdot \frac{1}{3} \end{aligned}$$

$$\boxed{x^{-1}}$$

$$\begin{aligned} \frac{1}{3} &\rightarrow 3^{-1} 3x = 151 \cdot 3^{-1} \\ x &= ? \end{aligned}$$

$$A \cdot A^{-1} = I$$

how do you solve for A^{-1} if it is a matrix?

Ex: $\begin{bmatrix} 2 & 1 \\ 4 & 3 \end{bmatrix} \cdot \begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$
 $A \cdot A^{-1} = I$

$$\begin{bmatrix} 2a+c & 2b+d \\ 4a+3c & 4b+3d \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$\begin{aligned} 2a+c &= 1 \\ 4a+3c &= 0 \end{aligned}$$

$$\begin{aligned} 2b+d &= 0 \\ 4b+3d &= 1 \end{aligned}$$

$$a = 1.5, b = -0.5, c = -2, d = 1$$

$$A = \begin{bmatrix} 2 & 1 \\ 4 & 3 \end{bmatrix} \Rightarrow A^{-1} = \begin{bmatrix} 1.5 & -0.5 \\ -2 & 1 \end{bmatrix} \quad \frac{1}{ad-bc} = \frac{1}{6-4} = \frac{1}{2}$$

$$\text{If } A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

$$\text{then } A^{-1} = \frac{1}{ad-bc} \cdot \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$$

if $ad-bc = 0$ then no inverse

TEST CORRECTIONS:

- ① Seperate Paper
- ② New (updated) Answer
- ③ WHY did you get it wrong?